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AR201-14065B

2002 NOV 12 PM 1:38

Substance Group: **Group 4: Dithiophosphate Alkyl Esters**

Summary prepared by: **Petroleum Additives Panel**
 Health & Environmental Research-Task Group

Date of last update: **October 7, 2002**

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1.0 Mammalian

1.1 Acute Dermal Toxicity

<u>Test Substance</u>	
CAS #	Mixed Isobutyl, isooctyl and pentyl derivative
Chemical Name	Phosphorodithioic acid mixed o,o-bis(iso-Bu, isooctyl, and pentyl) esters zinc salts
Remarks	Test material purity not provided
<u>Method</u>	
Method/Guideline followed	OECD Guideline 402
Test Type	Acute dermal toxicity (Limit Test)
GLP (Y/N)	N
Year (Study Performed)	1984
Species/Strain	Rabbits/New Zealand White
Sex	Male and female
No. of animals/sex/group	5
Vehicle	None
Route of administration	Dermal
Dose level	2 g/kg
Dose volume	2 ml/kg
Control group included	No
Remarks field for test conditions	<p>This study deviates from the above referenced guideline in that the dosing site was abraded prior to treatment. This was not considered a significant deviation from the guideline.</p> <p>Approximately 24 hours prior to topical application of the test material, the hair of each animal was closely clipped. Immediately prior to dosing the skin was abraded. A single dose of 2 g/kg of the undiluted test material was administered dermally to five male and female animals. The test material was kept in contact with the skin for a period of 24 consecutive hours under a gauze and elastic bandage. The application site was wiped clean of residual test material at the end of the 24-hour exposure period. The animals were observed for abnormal clinical signs frequently on the day of dosing and once daily for 14 days after treatment. Individual body weights were recorded on the day of dosing. The surviving animals were euthanized at the conclusion of the observation period. Gross necropsies were performed on all animals on Day 14.</p>
<u>Results</u>	LD50 > 2.0 g/kg (males and females)
Remarks	No mortality was observed. Clinical signs observed in all animals included cyanosis and decreased motor activity. The majority of animals exhibited motor incoordination. Four animals exhibited a loss

	of righting reflex. Recovery from most of these signs occurred by day three post treatment. Dermal findings included necrosis, edema and ulceration. Dermal irritation persisted through study termination. Gross pathological findings were limited to pitted kidneys in one female.
<u>Conclusions</u>	The test article, when administered dermally as received to 5 male and 5 female New Zealand white rabbits had an acute dermal LD50 of greater than 2.0 g/kg.
<u>Data Quality</u>	Reliable without restriction (Klimisch Code)
<u>References</u>	Unpublished confidential business information
<u>Other</u>	Updated: 7/13/00 (RTA-048)

1.2 Acute Inhalation Toxicity

<u>Test Substance</u>	
CAS #	Mixed Isobutyl, isooctyl and pentyl derivative
Chemical Name	Phosphorodithioic acid mixed o,o-bis(iso-Bu, isooctyl, and pentyl) esters zinc salts
Purity	Not Provided
<u>Method</u>	
Method/Guideline followed	OECD Guideline 403
Test Type	Acute Inhalation toxicity (Limit Test)
GLP (Y/N)	N
Year (Study Performed)	1986
Species/Strain	Rats/Sprague-Dawley
Sex	Male and female
No. of animals/sex	5
Vehicle	None
Route of administration	Vapor inhalation (single 4 hour whole body exposure)
Dose level	0.198 mg/L which included 74.2 ppm H ₂ S (actual maximum attainable concentration)
Vehicle control group	No
Chamber analysis	Yes (for hydrogen sulfide)
Remarks field for test conditions	One group of five rats/sex was exposed for 4 hours to the test material as a vapor generated by a glass distillation column filled with glass beads and heated to approximately 100°C. The distillation column was attached to a 3-neck flask. Test material was pumped into the top of the column. A portion of test material was vaporized and generated an atmosphere containing H ₂ S, among other possible vapors. The vapor was delivered into a 70-liter glass exposure chamber. The actual exposure concentration of H ₂ S as measured by gas chromatography was 74.2 ppm. The nominal concentration of the test material in the atmosphere was 0.198 mg/L. Animal observations for toxicological signs and mortality were recorded periodically during exposure and at least once daily during the 14 day observation period. Individual body weights were recorded on Day1 (immediately prior to exposure) and on Days 7 and 14. Serum cholinesterase evaluations were performed on all animals approximately 18 hours before and 30 minutes following exposure. Animals were sacrificed and subjected to a complete gross necropsy following the 14-day observation period.
<u>Results</u>	LC50 > 0.198 mg/L which included 74.2 ppm H ₂ S (maximum attainable concentration)
Remarks	All animals survived the exposure and observation periods. Lacrimation was recorded in two animals during exposure. Salivation, redness around the nose and discoloration around the mouth were observed following exposure. All animals appeared normal by day 8. All animals gained weight during the two-week study period. Serum

	cholinesterase values were variable and did not exhibit a consistent effect of test material exposure. One female exhibited gray lungs at necropsy. There were no abnormal postmortem findings evident in any of the other animals at study termination.
<u>Conclusions</u>	Following 4-hour whole body exposure to the test material vapor the LC50 in male and female Sprague Dawley rats was >0.198 mg/L which included 74.2 ppm H ₂ S. This was the maximum concentration attainable.
<u>Data Quality</u>	Reliable without restriction (Klimisch Code)
<u>References</u>	Unpublished confidential business information
<u>Other</u>	Updated: 7/1400 (RTA-050)